

What Is Claimed Is:

1. A method for loading a biological sample with a solute comprising:

disposing a biological sample into a solute solution comprising a solute and a chemical selected from the group consisting of a monosaccharide, a monosaccharide polyol, a cell metabolite-controlling agent, a salt, and mixtures thereof; and incubating the biological sample in the solute solution while maintaining a positive solute concentration increase (mM) to incubation (hours) loading gradient during incubating to load the biological sample with the solute.

2. The method of Claim 1 wherein said incubating comprises incubating the biological sample at a temperature ranging from about 35° C to about 39° C and from about 6 hours to about 10 hours.

3. The method of Claim 1 wherein said monosaccharide polyol comprises mannitol.

4. The method of Claim 1 wherein said cell metabolite-controlling agent comprises adenine.

5. The method of Claim 1 wherein said monosaccharide comprises glucose.

6. The method of Claim 1 wherein said metabolite comprises ATP.

7. The method of Claim 1 wherein said biological sample comprises a mammalian biological sample.
8. The method of Claim 1 wherein said solute solution additionally comprises a buffering salt compound.
9. A biological sample produced in accordance with the method of Claim 1.
10. A method for maintaining a viability level of a metabolite in a biological sample comprising:
 - disposing a biological sample into a solute solution comprising a solute and a chemical selected from the group consisting of a monosaccharide, a monosaccharide polyol, a cell metabolite-controlling agent, a salt, and mixtures thereof; and
 - incubating the biological sample in the solute solution while maintaining a viability level of a metabolite in the biological sample.
11. The method of Claim 12 additionally comprising maintaining a positive gradient of metabolite level during said incubating.
12. The method of Claim 10 wherein said maintaining a viability level of a metabolite comprises preventing a decrease in a metabolite level of the biological sample.
13. The method of Claim 10 wherein said metabolite is selected from the group consisting of ATP, 2,3-DPG and mixtures thereof.
14. The method of Claim 10 wherein said incubating the biological sample in the solute solution comprises incubating at

a temperature ranging from about 35⁰ C to about 39⁰ C for a period of time ranging from about 4 hours to about 8 hours.

15. A method for maintaining a viability level of a metabolite in a biological sample comprising:

disposing a biological sample into a solute solution comprising a solute and a chemical selected from the group consisting of a monosaccharide, a monosaccharide polyol, a cell metabolite-controlling agent, a salt, and mixtures thereof; and incubating the biological sample in the solute solution while maintaining a maintaining a positive gradient of change in a level of a metabolite to change in duration of incubation.

16. The method of Claim 15 wherein said metabolite comprises ATP.